USBL POSITIONING AND COMMUNICATION SYSTEMS

PRODUCT INFORMATION GUIDE
EvoLogics GmbH develops underwater information and communication systems based on bionic concepts, combining cutting edge engineering with the best ideas found in nature. The advanced product features have become enabling technologies for deep water exploration and production.

EvoLogics range of products offers highly reliable, flexible and cost-effective solutions for multiple underwater communication, positioning, navigation and monitoring applications. We strive for innovation and invest our vast experience into developing, manufacturing and supporting products that deliver an excellent performance and solve the most challenging tasks.

The company was founded in 2000 in Berlin, Germany, by a group of leading international scientists and maritime engineering experts. The company since focuses on developing innovative solutions for maritime and offshore industries, as well as smart robotic systems design and bionic research.

S2CR USBL Underwater Positioning and Communication Systems

EvoLogics S2CR USBL is a series of combined positioning and communication devices. Offering powerful USBL transceiver functionality with full benefits of an S2C technology communication link, S2CR USBL devices provide accurate USBL tracking and full-duplex digital communication, delivering an excellent all-round performance, ideal for application scenarios that demand space-, energy- and cost-saving solutions.

Switching between positioning and communication modes is not necessary: positioning data is calculated simultaneously with acoustic transmissions. Both features complement each other in a fully integrated positioning and communication system that opens new possibilities for a wide range of subsea applications.

- Full compatibility - use S2CR- and M-series modems as pingers or transponders
- Patented S2C (Sweep Spread Carrier) Technology - spread spectrum technology based on extensive bionic studies
- Simultaneous USBL positioning and data transmissions, track multiple targets simultaneously
- Can be used as Inverted USBL
- Self-adaptive algorithms for reliable performance in adverse underwater conditions, built-in forward error correction and data compression
- Advanced communication protocol with several data delivery algorithms: send and receive large volumes of data with the highest bitrate possible in current conditions; send and receive short instant messages without interrupting the main data flow between devices
- Addressing and networking: build relay chains and underwater networks with broadcasting capabilities
- Low power consumption and additional power-saving options

APPLICATIONS

Positioning of offshore equipment
Track the positions of offshore equipment during installation to ensure accurate placement at predetermined coordinates

Navigation of ROVs and AUVs
Simultaneously track positions of multiple ROVs or AUVs and control their missions with instant commands

Cartography
Locate underwater features with georeferenced coordinates when used together with GPS or differential GPS

Increase measurement accuracy
Track the position of sensors and detectors to increase the accuracy of measurements

Diver Tracking
Monitor positions of several divers and exchange information with them during the mission

MODULES AND OPTIONS

- AHRS (Attitude and Heading Reference System)
- GPS integration
- Integrated rechargeable battery
- Acoustic Wake-Up module
- Integrated data-logger
- Acoustic releaser
- Short- mid- and long-range devices for shallow or deep water applications
- OEM versions available
- Compatible with S2CR modem and LBL solutions

SENSOR INTEGRATION

- ADCP: Acoustic Doppler Current Profiler
- SVP: Sound Velocity Profiler
- CTD: Conductivity, Temperature, Depth, Pressure sensors
- INS: Inertial Navigation System
- More options upon request
A USBL transceiver is mounted on a Vessel and uses acoustic signals to determine the distances and bearings to the tracking targets. The USBL transceiver measures the time from transmission of its acoustic interrogation signal until an acoustic reply from the Transponder is detected and converts it to distance to the Transponder. Containing several transducers separated by a short distance (the ultrashort baseline antenna), the transceiver calculates the angle to the Transponder using the phase-differencing method.

Transponders are attached to several tracking targets, for example, to autonomous underwater vehicles (AUVs), remotely operated vehicles (ROVs), towfish etc. The Transponders reply to acoustic signals from the USBL transceiver with their own acoustic pulses, allowing it to calculate their positions. Optional third-party external instruments (an AHRS sensor and/or a GPS receiver) provide information about the vessel’s orientation and real-world coordinates. The customer’s Navigation computer is interfaced with the USBL transceiver and the external instruments and is connected to the local computer network.

Evologics positioning software, the SiNAPS, is installed on the Navigation computer. Evologics SiNAPS positioning software controls the positioning system and provides display features to monitor the mission in real-time.
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Transponders are attached to several tracking targets, for example, to autonomous underwater vehicles (AUVs), remotely operated vehicles (ROVs), or fixed installations. A transponder transmits a time-coded acoustic signal when interrogated by a transceiver. A USBL transceiver calculates the angle to the Transponder using the phase-differencing method.

A USBL transceiver is mounted on a Vessel and uses acoustic signals to determine the distances and bearings to the tracking targets. The USBL transceiver measures the time from transmission of its acoustic interrogation signal until an acoustic reply from the Transponder is detected and calculates the angle to the Transponder. The USBL transceiver and Transponder are connected via a network using NMEA data output, customizable data export, and access to data management tools.

### Useful display tools
- Distance measurement tool
- Settings management tool
- NMEA data output
- Customizable data export
- Access to data management tools
- External AHRS (Attitude and Heading Reference System) and an external computer network
- The SiNAPS server receives, processes and stores data from the USBL transceiver and other external instruments. The SiNAPS server provides access to data management tools and system configuration settings.

### The user interface
The SiNAPS client is the web-based user interface of the positioning system. It provides access to data management tools and system configuration settings. The user interface can be opened in most web-browsers.

#### Web interface
The SiNAPS UI can be accessed remotely via the local computer network. It is possible to open SiNAPS clients on multiple devices at once. To access SiNAPS UI, one must simply navigate the web-browser to the correct address.

#### Hardware interface
The SiNAPS server is a software component, installed on the Navigation computer. The SiNAPS server receives, processes and stores data from the USBL transceiver and other external instruments. The SiNAPS server sends data to the local computer network. The user interface can be opened in most web-browsers.

### Specifications and Configuration Options

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<td>18 - 34 kHz</td>
<td>18 - 34 kHz</td>
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<td>Horizontally omnidirectional</td>
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<td>Hemispherical</td>
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<td>up to 31.2 kbit/s</td>
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<td>up to 13.9 kbit/s</td>
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<td>INTERFACE &amp; INTERFACE CONNECTORS</td>
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<td>5 - 285 mW</td>
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<td>Transmit Mode</td>
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<td>POWER SUPPLY OPTIONS</td>
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<td>24 VDC (12 VDC)</td>
<td>24 VDC (12 VDC)</td>
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<td>Internal</td>
<td>Rechargeable battery 5 Ah or 10 Ah</td>
<td>Rechargeable battery 5 Ah or 10 Ah</td>
<td>Rechargeable battery 5 Ah or 10 Ah</td>
<td>Rechargeable battery 5 Ah or 10 Ah</td>
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<td>Dei: Stainless Steel</td>
<td>Robust metal, suitable for long-term deployment in harsh environments, depth rating 1000 m or 2000 m</td>
<td>Robust metal, suitable for long-term deployment in harsh environments, depth rating 1000 m or 2000 m</td>
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<td>DIMENSIONS</td>
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<td>Length Total</td>
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<td>WEIGHT, dry/wet</td>
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<td>4500/5000 g</td>
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<td>8600/2400 g</td>
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<td>INTERNAL AHRS</td>
<td>Dei: Internal inertial module, interchangeable with third-party AHRS modules</td>
<td>✔</td>
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<tr>
<td>USB interface</td>
<td>2-channel Wake Up Module version reacts to incoming data on two serial interfaces. 2-channel version available for R-series Wake-Up Module is installed. User-configurable Listen Mode is only available with a Wake-Up module installed. Power consumption in Listen Mode depends on Listen Mode settings. Contact EvoLogics for more information on power supply options.</td>
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<td></td>
<td>1) One RS-232 interface can be replaced with a RS-422 interface. Contact EvoLogics for more information!</td>
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<td>2) One RS-232 Interface can be replaced with a RS-422 interface. Contact EvoLogics for more information!</td>
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<td>3) Power consumption increases by 400 mW with AHRS installed.</td>
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<td></td>
<td>4) The Wake-Up Module mode transmits in vertical, slant and horizontal channels. 5) Dimensions of a Delrin housing, other builds are slightly larger.</td>
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<td>5) Dimensions of a Delrin housing, other builds are slightly larger.</td>
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<td>6) Internal inertial module, interchangeable with third-party AHRS modules.</td>
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<td>7) One RS-232 interface can be replaced with a RS-422 interface. Contact EvoLogics for more information!</td>
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sales@evologics.de
evologics.de

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